

**WHAT IS CLAIMED IS:**

1. A carrier head, comprising:  
a substrate backing assembly having non-conductive rigid components, the substrate backing assembly to provide a mounting surface for a substrate to be polished.
2. The carrier head of claim 1, further comprising a base assembly coupled with the substrate backing assembly, wherein components of the base assembly with at least a portion positioned within a sensing distance of the mounting surface are nonconductive.
3. The carrier head of claim 2, wherein the sensing distance is between about one tenth of an inch and about two inches.
4. The carrier head of claim 2, wherein the base assembly includes a non-conductive gimbal mechanism to permit the base assembly to move with respect to a housing.
5. The carrier head of claim 1, further including a non-conductive retaining ring secured to the base assembly with one or more non-magnetic fasteners.
6. The carrier head of claim 5, wherein the non-magnetic fasteners are also non-conductive.
7. The carrier head of claim 1, wherein the non-conductive rigid components are also non-magnetic.

8. The carrier head of claim 1, wherein the substrate backing assembly includes a non-conductive plate proximate to an upper surface of a flexible membrane.

9. The carrier head of claim 8, wherein the non-conductive plate is selected from the group consisting of a plastic plate and a ceramic plate.

10. The carrier head of claim 1, wherein the substrate backing assembly includes a flexible membrane and one or more clamp rings.

11. The carrier head of claim 1, further comprising a housing coupled with the substrate backing assembly via a base assembly, wherein components of the housing with at least a portion positioned within a sensing distance of the mounting surface are nonconductive.

12. The carrier head of claim 11, wherein the sensing distance is about one tenth of an inch.

13. The carrier head of claim 11, wherein the sensing distance is between about one tenth of an inch and about two inches.

14. A carrier head comprising:  
a housing to be secured to a drive shaft, the housing including one or more housing elements;

a base assembly, the base assembly including one or more base elements, the one or more base elements including means for permitting the base assembly to move with respect to the housing; and

a flexible membrane secured to the base assembly, the flexible membrane having a lower surface that provides a substrate-mounting surface, and wherein the base elements having at least a portion within a minimum distance of the lower surface are non-conductive, and further wherein the housing elements having at least a portion within the minimum distance are non-conductive.

15. The carrier head of claim 14, wherein the minimum distance is about one tenth of an inch.

16. The carrier head of claim 14, wherein the minimum distance is between about one tenth of an inch and about two inches.

17. A polishing system, comprising:  
a polishing pad having a polishing surface;  
a carrier to hold a substrate against the polishing surface of the polishing pad; and  
an eddy current monitoring system including an induction coil positioned on a side of the polishing surface opposite the substrate, the induction coil to generate a magnetic field through the pad into a sensing region of the system, wherein components of the polishing system with at least a portion positioned within a sensing distance of the polishing pad in the sensing region are nonconductive.

18. The system of claim 17, wherein the sensing distance is between about one tenth of an inch and about two inches.

19. The system of claim 17, wherein, in response to generating the magnetic field, the eddy current monitoring system is to receive an eddy current signal from one or more conductive regions on the substrate, an eddy current signal from one or more conductive components of the system in the sensing region, and a noise signal, and wherein the sensing distance is a distance beyond which the eddy current signal from the one or more conductive components of the system in the sensing region is not discernible over other noise signal.

20. The system of claim 17, wherein, in response to generating the magnetic field, the eddy current monitoring system is to receive an eddy current signal from one or more conductive regions on the substrate and an eddy current signal from one or more conductive components of the system in the sensing region, and wherein the sensing distance is a distance beyond which the eddy current signal from the one or more conductive components of the system in the sensing region is about equal to or less than an error amount corresponding to an acceptable amount of signal inaccuracy.